IN THE SPECIFICATION

Page 1, amend the title as shown.

HYDRAULICALLY OPERATED LOW PROFILE BOAT LIFT UTILIZING AT LEAST TWO PILINGS

Page 4, amend the description of FIG. 4.

FIG. 1 is a perspective view of a boat lift attached to a dock, in accordance with the present invention;

FIG. 2 is a partial top plan view of a cable-handling unit shown in FIG. 1 and with its top cover removed;

FIG. 3 is a partial top plan view showing an alternate embodiment of the cable-handling unit of FIG. 2;

FIG. 4 is a perspective view showing an ~~alternate embodiment of~~ the ~~boat lift shown in FIG. 1~~ cable-handling unit of FIG. 2;

FIG. 5 is a partial top plan view of the boat lift shown in FIG. 1 with the top cover of the cable-handling unit removed therefrom;

FIG. 6 is a partial side view showing a partial cross section of the cable-handling unit shown in FIG. 5;

FIG. 7 is an enlarged side elevational view of the boat lift shown in FIG. 1;

FIG. 8 is a partial perspective view showing the orientation of a plurality of pulleys for directing a cable up and over a boat lift piling, in accordance with the present invention;

FIG. 9 is a partial side elevational view of the pulley arrangement shown in FIG. 8;

FIG. 10 is an enlarged partial side elevational view showing the cradle secured to a transfer member with rollers positioned along the near and far sides of a piling ledge;

FIG. 11 is a side elevational view showing an alternate embodiment of the present invention;

FIG. 12 is a perspective view of the embodiment of FIG. 11;

FIG. 13 is a perspective view of an alternate embodiment of the present invention;

FIG. 14 is a perspective view of an alternative embodiment of the present invention; and

FIG. 15 is an enlarged front elevational view of the fluid reservoir shown in FIG. 11 including remote control apparatus.

Page 5, amend the last two lines as shown.

The present invention is a hydraulically operated boat lift having a plurality of embodiments: each shown generally at numeral 12 securable to the end of a dock 11, as generally shown at 10 in FIG. 1. The boat lift 12 is also securable to a bulkhead (not shown) or other similar structure that can sufficiently support the combined weight of a boat and boat lift 12.

Page 6, amend each full paragraph as shown.

In construction, the boat lift 12 includes a lift cradle, each embodiment of which is identified by numeral 13 and lift means 14 that further includes an elongate cable-handling unit (CHU), each embodiment of which is identified by numeral 15. The top cover 15' is generally rectangular and is removable and may serve as an access panel for accessing the interior of the CHU 15. Lift cradles 12 may employ various specific structures such as that shown by numeral 24 of FIG. 1.

As perhaps best shown in FIG. 7, the bottom surface of the CHU 15 at each end thereof is secured to the top surface of the dock 11 via conventional brackets 49 and fasteners 56, as commonly known in the boating industry. The brackets 49, 50 may have a horseshoe shape as shown in FIG. 1, or may have an alternate shape, as shown in FIG. 7. In either case, the fastening member 56, such as a threaded screw, for example, is preferably passed through its corresponding bracket 49, 50 and the dock [[31]] 11 for firmly securing the CHU 15 thereto.

Now referring to FIG. 2, a conventional hydraulic system 16 includes piston arm 18 and cylinder 20 (FIG. 12) is housed within and at one end of the CHU 15. Of course, the piston arm 18 may be positioned at the opposite end of the CHU 15 if desired. A conventional sump or fluid reservoir 19 (FIG. 15) is removably attached to the piston

arm 18 and positionable on or beneath the dock 11, as desired by an operator. The fluid reservoir 19 may include a pair of hoses for supplying and withdrawing fluid to and from the cylinder 20, respectively. One hose is connected adjacent to the stationary cylinder end 21 and the other hose is connected closer to the movable end 32 of piston arm 18 thereof.

With the stationary cylinder end 21 of the piston arm 18 being secured at one end of the CHU 15 via conventional means via bracket 48, the movable end 32 of the piston arm 18 is allowed to expand and contract within the CHU 15 and along the longitudinal length thereof as the fluid reservoir [[53]] 19 operates the piston arm 18 in a manner well known in the industry. As clearly shown, the top cover 15' of the CHU 15 may be removed to provide ready access to the mechanical parts housed therein.

The CHU 15 further houses a portion of pulley/cable system 17 ~~having~~ (FIG. 1) which, in the embodiment shown has a first plurality of pulleys 33-36 with pulley 36 positioned at one end of the CHU 15 adjacent the stationary end 21 of the piston arm 18, and pulleys 34-35 positioned at the opposite end of the CHU 15. Pulley 33 is fixed to the movable end 32 of the piston arm 18 and travels back and forth along the length of the CHU 15 and in a substantially horizontal direction corresponding to travel path of the movable end 32 of the piston arm 18. Such a movable end 32 can slide between a fully retracted position and a fully extended position where the fully retracted position places the movable end 32 of the piston arm 18 adjacent to the stationary end 21 thereof for maintaining the boat at a high position and the fully extended position places the movable end 32 of the piston arm 18 adjacent to pulleys 34, 35 for maintaining the boat at a low position.

Page 7, amend the last line of the first full paragraph as shown. Also, amend the second and third full paragraphs as shown.

Pulleys 34, 35 are spaced substantially equidistant from movable pulley 33 when the movable end 32 of the piston arm 18 is at a fully extended position and are preferably aligned with the piling 23 while pulley 36 is preferably aligned with piling 22. Pulleys 34, 35, 36 are secured to the bottom surface of the CHU 15 via conventional brackets and screws and therefore are stationary with respect to the movable pulley 33.

A pair of cables 39, 40 each have one end connected to the movable end 32 of the piston arm 18 and are guided through the pulleys 33-36, as clearly shown in FIG. 2. With the predetermined orientation of such pulleys, a moderate to heavy boat may be vertically lifted/lowered a distance, 3*D, by horizontally transferring the moving end 32 of the piston [[37]] 18, D, as discussed in more detail hereinbelow.

In an alternate embodiment of the CHU 15, as shown in FIG. 3, pulley 34 is removed from the CHU 15 and is replaced with a support member 41. Such a support member secures one end of each cable 39, 40 as same are guided through the pulleys 33, 35, 36, in a manner clearly shown.

FIG. 4 shows yet an alternate embodiment of the present invention wherein the cables 39, 40 are not directed up and over a pair of corresponding pilings 23, 22, respectively, as discussed hereinbelow. Rather, such cables are guided downwardly via pulleys 42", 45" where they connect to corresponding transfer members 26, 25 for lifting/lowering the cradle 13. Now referring to FIGS. 5-10, pilings 22, 23 are secured to the end of the dock 11 by conventional brackets with a second plurality of pulleys 42-44, 45-47 positioned adjacent and on top thereof, respectively via fasteners 57, 58. In particular, pulleys 42 receive cable 40 from pulley 36 for directing cable 40 up and over piling 22 via pulleys 43,44 for connecting to an associated transfer member 25. Accordingly, pulleys 36, 42 transition the path of cable 40 from a substantially horizontal direction from within the CHU 15 to a substantially vertical direction as cable 40 exits the CHU 15.

Page 8, amend the last line of the second full paragraph as shown. Also, amend the fifth line of the last paragraph as shown.

Pulleys 43, 44 are secured to a cap 54 at the top end of piling 22 for guiding the cable 40 downwardly and generally outwardly along the piling 22 and connect cable 40 to transfer member 25 movable along the length of piling 22. The opposite end of cable 40 is attached to a top end of transfer member 25 via a conventional locking device 65 readily known in the industry and as clearly shown in FIG. [[11]] 10.

Both transfer members 25, 26 help lift/lower the cradle 13 including a pair of bunk rails 27, 28 extending outwardly and perpendicularly therefrom. Thus, each elongate member 27, 28 has one end secured to a corresponding transfer member 25, 26 and supported in place by support members 68, shown in FIG. 10. The free end of each elongate member 27, 28 is positioned on the far side of the respective pilings 22, 23. Each support member 68 provides sufficient support to allow the cradle 13 to support a boat thereon. Transfer member 25 includes a pair of roller sets 63, 64 spaced at opposed ends thereof. It is noted that transfer member 26 is substantially similar to transfer member 25 and, therefore, it should be understood that both transfer members perform substantially the same function in substantially the same manner. Roller sets 63, 64 are secured to their corresponding transfer member 25 via conventional means wherein a corresponding plurality of top rollers 63 are secured to a top end of transfer member 25 via a bracket 66. Such a bracket 66 is attached around the top end of the transfer member 25 for maintaining roller set 63 in place as the transfer member 25 moves upwardly and downwardly along piling 22.

Page 9, amend the last line of the last full paragraph as shown. Amend the fourth line of the last paragraph as shown.

As shown in broken line in FIG. 1, a second pair of pilings 89, 90 may be positioned adjacent each respective free end of bunk rails 27, 28 in a manner for allowing a second pair of transfer members 91, 92 to attach to such free ends and move upwardly and downwardly along the pilings 89, 90 corresponding to the movement of transfer members 25, 26. The second pair of transfer members 91, 92 may not be connected to additional cables and pulleys. In such case, the transfer members 91, 92 would primarily function as guides to prevent lateral movement of the cradle 13 as it travels up and down the pilings 89, 90 during heavy winds and the like. A pair of stops 93 may be inserted at a predetermined position along the second pair of pilings to prevent the cradle 13 from moving therebeyond. Pulley brackets 59-62 are conventional as understood in the art.

Now referring to FIGS. 11-12, an alternate embodiment of the boat lift 12 is shown wherein the pair of pilings 22, 23 are disposed away from the end of the dock 11

and supported by the bottom of a body of water. Each end of cables 40', 39' are secured to a top end 96. 97 of the pilings 22, 23 by a pair of brackets 98, 99, respectively. The pilings 22, 23 are spaced apart from each other and are aligned with corresponding pulleys 42", 80, 81 and 45", 82, 83, respectively. Pulleys 80, 81 are attached at opposite ends of elongate bunk rail 27 and pulleys 82, 83 are attached at opposite ends of elongate bunk rail 28. A pair of bunks 29, 30 each have opposite ends secured to the bunk rails 27, 28 and are disposed generally medially thereof for receiving a boat thereon.

Page 10, amend the second full paragraph as shown.

The alternate embodiment of the boat lift [[20']] 12, shown in FIGS. [[12-14]] 11-12, is operated in a substantially similar manner as the previous embodiment. With the cable-handling unit [[21']] 15 cylinder piston [[37]] 18 in the fully retracted position, the bunks 29', 30' will be at their highest position relative to a dock [[31]] 11 surface. This position, for ease of explanation will be referred to as the parked position. From the parked position, when the fluid reservoir on/off switch 101 is placed in the "on" position, a drive (raise) command is generated for commanding the movable end 32 of the piston [[37]] arm 18 to retract fully thereby removing the load from the set parking [[lot 53]] latch (not shown). In particular, as the movable end 32 of the piston [[37]] arm 18 retracts, the movable pulley 33 mounted thereto begins to pull against the cables 39', 40'. The pulley bracket 41 holds one end of the cables 39', 40' stationary, thereby translating all resultant force through the moving pulley 33 and pulleys 35', 42", 45" (FIG. 4) and finally against the brackets securing the cable ends to the top of the pilings 22, 23.

Page 11, amend the first and second full paragraphs as shown. Amend the fourth full paragraph as shown. Amend lines 2 and 4 of the last full paragraph.

With regard to FIG. 13, an alternate embodiment of the lift 12 is illustrated. A pair of tilted pilings 103 and 104 carry a respective pair of elevator trolleys 105 and 106. Bunk rails 107 and 108 carry bunks 29 and 30. 107' and 108' are support members

formed either integrally with rails 107 and 108 respectively or are attached in a conventional manner as understood in the art. Lower trolley rollers 109 and 110 and upper trolley rollers 117 and 118 guide trolleys [[103]] 105 and [[104]] 106. Cable portions 120 and 121 are as before as are cable-handling unit 15, pulley assemblies 111-114; arm 116; end 115, brackets 122 and anchor 119.

The embodiment of FIG. 13 provides a function similar to the embodiment of FIGS. 5-10 by providing more clearance between a boat 67 and the pulley/cable apparatus near the upper portion of pilings [[104]] 103 and [[105]] 104.

With the power switch, shown generally at 101, at the "on" position and the brake release switch 100 in the "operate" position, moving the "raise/lower" switch 102 to the down direction can lower the vessel, as generally shown in FIG. 11 at reference number 84 (FIG. 15). The raise/lower switch 102 is positioned next to the power switch 100 and is a momentary 3-position switch, which must be held in either position. Such a type of switch is commonly known as a "dead man's" switch.

When installing any boat lift 12 of the present invention, the minimum height of the cable-handling unit 15 may be adjusted to prevent excessive cable [[39, 40]] slack from being generated. Positioning sensor switches connected to the movable end 32 of the piston arm 18 and ~~a second member 95 attached to~~ the interior of the cable-handling unit 15 in the travel path of the moving end 32 of the piston arm 18 does this. When the movable end 32 of the piston arm 18 reaches a switch indication can interrupt the power if necessary. The maximum height is equal to the hydraulic piston arm 18 maximum retracted position.

Page 12, amend line 2 of the first full paragraph as shown.

Any embodiment of the present invention may also be fitted with a conventional remote control system 87, 88 (FIG. 15) for operating same. Such a system preferably includes a receiver 87 connected to the electrical control box 84 and a transmitter 88 carried by an operator. The system may be operated by infrared signals, RF signals, or other suitable conventional signals as understood in the art.

Page 13, cancel the first second and third full paragraphs.

distance, D, three cable portions 77-79 of each cable 39, 40, defined in FIGS. 2 and 3, must also travel a distance, D. Therefore, each cable portion 77-79 must travel a distance equal to 3*D. A 2:1 ratio is achievable in the alternate embodiment employing only two pulleys 33, 35 with two cable portions 81, 82, as shown in FIG. 3.

~~With the power switch, shown generally at 101, at the "on" position and the brake release switch 100 in the "operate" position, moving the "raise/lower" switch 102 to the down direction can lower the vessel, as generally shown in FIG. 12 at reference number 84. The raise/lower switch 102 is positioned next to the power switch 100 and is a momentary 3-position switch, which must be held in either position. Such a type of switch is commonly known as a "dead man's" switch.~~

~~When installing the boat lift 20', the minimum height of the cable-handling unit 21' may be adjusted to prevent excessive cable 39', 40' slack from being generated. Positioning a sensor switch including a first member 94 connected to the movable end 32' of the piston 37 and a second member 95 attached to the interior of the cable-handling unit 21' in the travel path of the moving end 32' of the piston 37 does this. When the movable end 32' of the piston reaches the first member 94, a power circuit is tripped thereby stopping the movable end 32' of the piston 37. The maximum height is equal to the hydraulic piston's 37 maximum retracted position.~~

~~The present invention may also be fitted with a conventional remote control system 88, 89 for operating same. Such a system preferably includes a receiver 88 connected to the electrical control box 84 and a transmitter 89 carried by an operator. The system may be operated by infrared signals, RF signals, or other suitable conventional signals.~~

The use of the additional pulley 34 in the embodiments of FIGS. 2, 4 and 5 is generally called for in applications where the lengths of cable used with the cable-handling units are critical or where total lifting distances exceed 15 feet.